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Scientific Productivity of
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THE SCIENTIFIC PRODUCTIVITY OF AMERICAN PROFESSIONAL PSYCHOLOGISTS

BY SHEPHERD IVORY FRANZ

Within the past few years there have appeared reviews of the progress of psychology for different periods of time.¹ That general progress has been made is evident. That in America progress has been made is shown by the inauguration and rapid increase in the membership of the American Psychological Association, by the foundation of journals devoted to the publication of psychological discussions and researches, by the appearance in numbers of psychological books and articles, by the great popular interest which has been aroused, by the birth and growth of numerous laboratories for teaching and investigation, by the creation of special university chairs apart from those for allied disciplines (especially philosophy and education), and by the establishment of special research laboratories for applied psychology. It is also pertinent to remark that during this developing period of psychology there have been begun and continued several lines of investigation which, although not entirely American, have continued in mass and in importance to be due to workers in this country.

Although there is abundant evidence of advance, those historians who have recounted the progress have dealt with their theme in an impersonal way. They have reported the number and the character of the published investigations, the establishment of independent departments, and the number of conferred doctorates. They have not dealt with an equally important subject which is germane to the one regarding which they have written. We have not been informed by whom the psychological advances have been made, or whether or not in view of the increasing number of

¹ See C. A. Ruckmich, 'The Last Decade of Psychology in Review,' *PSYCHOL. BULL.*, 1916, 13, 109-120. This contains references to previous reviews of like character.

professional psychologists there has been a corresponding increase in the number or in the value of the published investigations. In other words, although it is admitted that advance has been made, we are as far from knowing whether or not the advance has been satisfactory and corresponds with the number of psychologists.

The estimation of the value of an individual's contributions has been attempted from time to time and in a variety of ways. There is the well-known attempt to grade psychologists by votes of a few selected individuals. The general results of this grading have been reported.¹ There has also been a negative grading of psychologists in general in the elections to the National Academy of Sciences. Of the five so-called psychologists who have been members, three at the time of their election were professors of philosophy and primarily interested and concerned in the teaching and publication of philosophical (ontological, epistemological, and logical) doctrines. There has also been a continuing selection (and promotion) of men for professorships and other academic positions, which selection acts as a grading of a less obvious kind. The last kind of selection brings about two adverse conditions, one of them being that an individual selected for a position because of time-serving or personal recommendation has automatically acquired a claim to a grade to which his previous position and work did not apparently entitle him, the other being that because of this there has been a considerable amount of time-serving and inbreeding in some of our institutions.²

All of these methods of estimating the relative ranks of individuals have obvious and with respect to even their temporary value perhaps vital defects. Much the same may be

¹ 'American Men of Science.' Ed. by J. McK. Cattell. 2d ed. 1910. See especially pp. 537-596. The results have been given in only a general way; the names of the judges are not mentioned, and we must depend upon the editor's word that they were competent.

² While it may not apply to psychologists it is not unknown in scientific circles that some individuals, because of personal charm or characteristics such as self-appreciation and a hypercritical attitude toward others, have been able to attract students and have been able to persuade others of their importance and to get a self-enhanced reputation spread.

said regarding methods now in use for the determination of the value of a published research or other contribution. If the different methods were used in combination and subjected to safeguards respecting individual interests they would probably give better estimates than have hitherto been made. To take individuals at a given time and settle upon values or grades may be necessary, but it should be recognized that the grades shift at different times. The same holds true with regard to estimated grades or values of performed work. The supposed values of the nineteenth century do not hold for the twentieth, nor do those of today hold for tomorrow. It is, however, possible to determine whether or not a given individual or a group has carried out some of its functions, and to determine whether or not certain individuals have fallen short or have done more than their normal or expected share. We may assume as proven that in psychology there has been satisfactory advance in general, both in character and in quantity of the work, and we may inquire: "By whom have the advances been made, and in what manner have individuals or groups contributed to the advance?"

It has already been said that if we wish to deal with absolute value it is not possible to make satisfactory judgments, and answers to the questions could not be given. No one psychologist has sufficient knowledge of methods and results in all branches of psychology to be considered a sufficiently expert judge. Nor has any one the confidence of all or of a majority of psychologists. Each judge of values is influenced in making his judgments by considerations of training, of knowledge, and perhaps of special personal interest. There is no absolute impartiality. The introspectionist does not hesitate to say that behavior studies are not truly psychological. The behaviorist may reply that there is no such thing as the introspection that is talked about so much. He who does not hesitate to teach and write about the functions of the parts of the nervous system may never have performed or seen any of the classical cerebral experiments; by some psychologists the realm of the abnormal has never been visited and by them it is known only like uncharted parts in a geog-

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raphy; and the remainder of applied psychology is for many like a prostitute whose acquaintance is not desired and who is to be shunned because of fear of infection.

Notwithstanding the limitations of value of individual opinion, much might be gained by taking a consensus of opinion of those of divergent special interests and of those who are admitted to be fair jurymen.¹ But we can also do something very definite by determining that a certain individual has or has not made any published contribution towards psychological advance.² This is a comparatively easy method giving positive results. It admits of little or no discussion of a judge's partiality, it rests solely upon the admission of published material as the facts with which to deal. We may also determine that one has contributed by books, or by the publications of investigations, or by any other means which we may select. And there is also the possibility of answering the question, "Has the progress, as measured by the number of publications, corresponded with the number of individuals who have become professional psychologists?"³

¹ Not related academically to the individuals to be judged, supplied with all the data respecting the individuals (not with only a part as was done in Cattell's 'American Men of Science' classification), and of sufficiently diverse individual interests to form a jury representative of all branches of psychology.

² There is little possibility of determining the value to psychology of the individual's college or university teaching. Some indication might be obtained by the determination of the academic antecedents of psychologists and of those who have taken advanced courses in psychology but who have not become professional psychologists. This does not mean the determination of the number of conferred doctorates. It is often forgotten that the interest of the individual has been created before he has known of the possibility of advanced work, and the doctorates give in the main only a clue to the institutions which are recommended by those who have created the interest, or which are selected because of material advantages. Another method of determining the value of the individual teacher would be that of estimating the average value and the amount of published work which his students put forth after leaving him. Not all of their subsequent work is due to his influence but an estimate could be made.

³ The consideration of these matters has been somewhat forced upon me in connection with editorial duties during the past few years, since it was necessary to know what lines of work were being investigated and by whom. During a longer period of time I have not infrequently been asked to offer suggestions regarding possible candidates for positions, and having had very few students fitted for such positions, I have taken the opportunity to recommend those who have exhibited some accomplishment (publication) rather than those who were known to me as individuals of 'promise' in their advanced work. The results of some of these casual inquiries regarding accomplishment were so different from what I had expected that it led to the consideration of a larger group.

We have available for the purpose well-known yearly bibliographies, and the present article has been made possible because of them. The membership list of the American Psychological Association was consulted to obtain a list of our 'professional' psychologists. Since membership in the Association is not limited to those who are instructors or professors of *psychology*, only those whose official positions consisted *solely* in relation to psychology were considered to be the professional psychologists.¹ Since those few who hold only research positions can not be dealt with in the same manner as teachers, I decided to omit their names from the list to be investigated. This left 87 names, of which three were omitted because of the lack of certain data which I thought essential. The 84 individuals represent 48 institutions, 45 as professors, 26 as assistant, associate or adjunct professors, and 13 as instructors. The academic titles mean little but they are mentioned only to indicate the range or the number of departments of psychology. Five individuals were connected with one institution, four with another, there were three in each of nine institutions, there were two in each of eleven, and one in each of twenty-six institutions. Half of the men had received their doctorate during the decade as follows: 1906, 2; 1908, 6; 1909, 6; 1910, 4; 1911, 2; 1912, 10; 1913, 7; 1914, 4; 1915, 1.

Since my immediate interests have been connected with recent publications I selected the past ten years, 1906 to 1915, inclusive, and have tabulated the contributions of each of the 84 individuals for each year. The contributions which have been listed were found in the *PSYCHOLOGICAL INDEX*.²

¹ The 1916 membership list was used. This contains the titles of positions as supplied by the members, and is presumably correct. I am convinced that some of the titles are incorrect, but the mistakes are relatively unimportant. I have not gone beyond the official returns. Some professional psychologists who are not members of the Association are not included. Some of them are known to the writer, but it seemed unfair to include them, since they are not members of the national body of professional psychologists.

² This bibliography does not give references to all of the publications of psychologists, some contained in inaccessible periodicals are not given, some which are not psychological are not noted, but the failure to list all the psychological publications of any one individual rests solely with that individual, since the *INDEX* asks that omissions

The different kinds of contributions have been listed under the following titles: Monographs, Original Articles, Discussions, Books, General Reviews, Reports of Meetings. A few translations of American books into foreign languages were omitted, on the ground that the original authors had already made the contribution and the work of translation was that of another. Translations of foreign books into English were also omitted from consideration. In some cases it is difficult to decide whether a certain publication is a discussion or an original article, in other cases whether a publication be an original article or a monograph, or a monograph or a book. Some periodicals publish long articles which in other series would be published as monographs, but they have been dealt with as they stood. When doubt arose as to the character of the publication the contributor was given the benefit of the doubt.¹ The inclusion of general reviews and reports of meetings may need justification. They have appeared to me to be legitimate methods of advancing psychology because they may create interest to investigate certain matters or give facts to others which would not ordinarily be discovered, etc. Their value, however, must be considerably less than those of publications containing the results of personal investigations. Somewhat similarly with books, since they are largely compilations of the work of others.

Table I. gives the results of the examination of the INDEX for the individuals and the decade under consideration. Here there are shown the numbers of each kind of publication for each year and for the ten-year period. It will be seen that with the exception of a few lean years (1907, 1914) the number and corrections be supplied. A few mistakes were noted, when they were obvious they were taken account of in the tabulations. The tabulations by years are not always exact on account of the inability of the INDEX compilers to secure all the references for a particular year at the time of publication, but titles omitted in one year are found in the next number.

¹ That is, as will be noted below, an artificial value was assigned to each kind of publication, and when doubt arose the higher value was assigned. At the same time a 'joint' article, etc., was assigned to both individuals, and given in each case its full value. I was at first inclined to reduce the article value for 'minor contributions,' but I concluded to let the above consideration hold. The recent publication of the Proc. Nat. Acad. of Sciences was another difficult matter. The 'articles' in that journal are in reality abstracts or summaries (*Auto-referate*).

TABLE I

KINDS OF PUBLISHED CONTRIBUTIONS OF PROFESSIONAL PSYCHOLOGISTS FOR THE
DECADE, 1906-1915, INCLUSIVE

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	Totals
Monographs.....	1	3	2	2	5	5	5	10	6	6	45
Articles.....	46	36	43	49	42	44	59	58	39	76	492
Discussions.....	7	4	5	7	2	8	9	12	9	3	66
Books.....	2	1	10	6	3	6	8	5	9	5	55
Reviews.....	4	1	4	3	4	29	32	25	26	33	161
Reports.....	1	0	4	3	4	6	3	2	4	5	32
Totals.....	61	45	68	70	60	98	116	112	93	128	851

of research articles and monographs has not differed very greatly from year to year and there is a fairly gradual increase. There is a slight increase in 1912 and 1913 over the preceding years and a greater increase in 1915 over 1913 and 1912. The notable decrease in 1914 is not explained.¹ It may be that the increase of interest in the subject of tests is responsible, those who had taken up this line of work being occupied in 1913 and 1914 with the accumulation of facts which were published in 1915.² When we look at the yearly totals we note that the increase began in 1911, and this was coincident with the inauguration of the series of general reviews in the *PSYCHOLOGICAL BULLETIN*.

Table II. shows the distribution of the contributors over the ten-year period. It is a remarkable fact that the first five years are almost constant in number of contributors and that the increase in the number of contributors has taken

¹ A writer in the *New York Times* book review supplement has mentioned that in general literature 1914 was a lean year. The reason is not obvious in that case or in the case of our psychological publications, since the European war could not have its effect on production until very late in the year. In connection with psychological journals this effect should have been more noticeable in 1915 if it existed because of the war.

² Ruckmich reports over 800 *original* articles for the decade 1905-1914. Probably the number in 1905 was nearer that for 1906 than that for 1915 of the present table. On that assumption we would have about 500 titles of *original* articles and monographs for that decade by professional psychologists. Not all of these have appeared in the magazines listed by Ruckmich, and in comparison with the 'over 800' noted by Ruckmich it is apparent that fully 3/8 of the grand total was contributed by the non-professional psychologists, or by those whose loyalty was divided between psychology and philosophy, education, etc.

TABLE II

GROUPING OF PROFESSIONAL PSYCHOLOGISTS ACCORDING TO YEARLY NUMBER OF PUBLICATIONS, FOR THE DECADE, 1906-1915, INCLUSIVE

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915
1 contribution.....	15	16	12	11	17	14	20	17	19	28
2 contributions.....	10	7	8	8	8	9	13	13	13	12
3 contributions.....	3	3	5	6	3	7	5	5	8	6
4 contributions.....	0	0	1	2	2	0	2	5	2	6
5 contributions.....	2	0	1	1	2	6	1	3	2	1
6 contributions.....	0	1	0	2	0	0	2	2	1	2
7 or more contributions.....	1	0	2	0	0	2	4	1	0	2
Totals.....	31	27	29	30	32	38	47	46	45	57

place during the past five years. The greatest number of contributors is found in 1915, the year of the greatest number of contributions. This table also shows what may be termed the scientific activities of psychologists for it gives the number of publications of groups of individuals. For the past five years about 30 per cent. of those who contributed published three or more articles, etc., each year. This is, of course, not to be taken to mean that the same individual did this from year to year, although it may be mentioned that the tabulation of the material indicates that the man who does it one year is more apt to repeat with more than a single contribution for the following years.

Since not all of the individuals on our list have been, nor could they be expected to be, active in publication during the whole of the decade it is of interest to compare the figures which are given in Table II. with the examination of the years of the doctorate or other higher degree which is held. There were 42 individuals who had obtained their higher degree anterior to 1906.¹ The other 42 could not be expected to publish work before their doctorate, although some did so. Counting the date of the doctorate as the date when publication might reasonably be expected, the numbers of individuals expected to publish were obtained by adding the new doctors to the original 42 at the beginning of the decade. It has already been mentioned that some published before the doctorate, the number being 14 (out of a total of 42), and a few published more than one article.

¹ Two individuals on the list hold the Master's degree only.

When now we compare the number of expected contributors with the actual number of contributors we find an interesting condition. Table III. gives the data. Although the number of expected contributors increased during the first five years the yearly number of actual contributors did not increase. The increase in contributors came during the second half of the decade, but the percentage of expected contributors who published is the same (68 per cent.) at the beginning and at the end, there being a decrease in the percentage up to the year 1910 and an increase thereafter. If we separate out those contributions which are intended to convey new facts or new interpretations,¹ which would limit us mainly to articles and monographs, we find an even more

TABLE III

THE PUBLICATION ACTIVITIES OF PROFESSIONAL PSYCHOLOGISTS FOR THE DECADE, 1906-1915, INCLUSIVE: THE NUMBERS OF EXPECTED CONTRIBUTORS, OF ACTUAL CONTRIBUTORS, OF THOSE CONTRIBUTING ARTICLES AND MONOGRAPHS, AND THOSE CONTRIBUTING PREVIOUS TO DOCTORATE

	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915
Expected contributors.....	44	44	50	56	60	62	72	79	83	84
Actual contributors.....	30	26	26	28	29	37	43	45	45	57
Contributors of articles and monographs.....	28	24	23	26	28	27	30	34	35	40
Contributors previous to doctorate (additional).....	1	1	3	2	3	1	4	1	0	0

interesting comparison. At the beginning of the decade there was a total of 44 individuals expected to contribute. Of this number 28 made contributions of articles and monographs (64 per cent.). The percentage (actual contributors in relation to expected contributors) decreased in the following years as follows: 55, 46, 46, 47, 44, 42, 43, 42, 48. The contributions anterior to the doctorate by those who contributed previous to their doctorate are not included in these calculations. It is to be observed, therefore, that the percentage of original contributors has decreased and the percentage of total contributors at first decreased and later reached its original figure. The great differences in the percentages from 1911 to 1915 inclusive are to be understood

¹ It is not intended to say that books, discussions, reports or reviews do not contain new facts and new explanations, but that they are less apt to do so.

primarily as the result of the publication of general reviews and an apparent satisfaction of the authors of these reviews in their accomplishment.

The subject of books deserves a separate paragraph. These were mainly the work of the group of older men, for of the 55 books which have been published in the decade only five have been written by those whose doctorates were granted in 1906 and subsequently. Two men were responsible for one book each, two for two books each, four for three books each, one for four books, and one for fifteen books. The years of publication of the 55 books are shown in Table I.

Mention has already been made of the increase in the expected contributors owing to the granting of the doctorate. The original 42 names have had added to them an equal number. Of these additional 42, 14 published previous to the doctorate. The first publication after the doctorate, in most cases dissertations or parts of dissertations, of 18 was made in the year of the doctorate, of 10 the first publication was in the year following the doctorate, of 9 in the second year, of 1 in the third year, of 2 in the fourth year, and of 1 in the fifth year after the granting of the doctorate. No publication by one who received the doctorate in 1913 had been made up to and including 1915. These figures show that either our means of publication are insufficient, or that the dissertations presented in partial satisfaction of the doctorate are not nearly ready for (or are not worthy of) publication, or both.¹

The 42 individuals who had received the doctorate prior to 1906² might each have contributed something in each of the ten years under consideration, but only seven did so. Seven others contributed in 9 of the ten years; 4 in 8; 4 in 7; 6 in 6; 1 in 5; 2 in 4; 3 in 3; 2 in 2; 2 in only one of the years; and 4 had no publications. Those who received the doctorate in 1906 and subsequently can not be dealt with in the same man-

¹ It might be well for university authorities to deal a little more strictly with the matter of publication. The publication of a dissertation in part or as a whole is the only evidence to the world outside of the particular university that the individual has shown a capacity for investigation, one of the main doctorate requirements in all institutions of which I have knowledge.

² Including the two who have not taken the doctorate.

ner, but the groups in accordance with the percentage of years in which contributions were made, counting the total of years since the doctorate as the expected total, are as follows: 0, 1; from 1 to 10 per cent., 7; 11 to 20 per cent, 5; 21 to 30, 4; 31 to 40, 5; 41 to 50, 13; 51 to 60, 1; 61 to 70, 1; 71 to 80, 3; 100 per cent., 8. The number of older men who averaged at least one contribution for every two years, or more often, is double that of the younger men. The younger men had more than two thirds of their number who did not publish as much as one contribution for every two years. It should further be stated that of the younger men placed in the most regular class (100 per cent.) one contributed original work in only one of 8 years, a second in only two of 6 years, a third in six of 7 years, and a fourth in two of 3 years. The other 4 contributed an article or monograph in each of the expected years. Of the older men in the 100 per cent. class, one failed to report original work in only one of the ten years, one did not report such work for two of the years, and two for three of the years. Three contributed at least one article or monograph in each of the ten years.

Comparing the two groups we find that of the 420 expected individual years of publication of the older group (10 years each for 42 individuals) there were only 257 individual years of publication, a percentage of 61; of the younger group there were 214 expected years and an actual total of 109, a percentage of 51. This difference is entirely accounted for by the long delay in publication after the doctorate, for if the delay periods be subtracted from the total there is a percentage of 61 for the younger men. Although there is not a sufficient number of years to make the conclusion certain, the figures would lead to the belief that when the younger men start there is not a great difference in total productivity between them and the older men. My impression previous to tabulation was the reverse, probably because of some notable examples of productivity of the older men. The latter is counterbalanced by the fact that there are five of our professional psychologists, four of the older group and one of the younger group (the latter case mentioned above), who have

not published anything worthy of citation in the *PSYCHOLOGICAL INDEX* in ten years.

The individual differences which have been mentioned are better shown when we compare the totals and yearly averages for the individuals of the groups. It would not be expedient to mention names of individuals, or to designate them in recognizable terms, so that we must fall back upon generalities of individual differences. Of the older group there are four who did not make a scientific contribution of such a character or in such a journal as to be deemed worthy of mention in the *INDEX* in the decade; there is only one of the younger group. In addition the contributions of one of the older

TABLE IV

DISTRIBUTION OF PROFESSIONAL PSYCHOLOGISTS ACCORDING TO THE NUMBERS OF CONTRIBUTIONS IN THE DECADE, 1906-1915, INCLUSIVE

Number of Publications	Total Publications		Articles and Monographs	
	Older	Younger	Older	Younger
0.....	4	1	5	1
1 to 10.....	14	35	16	38
11 to 20.....	12	4	16	2
21 to 30.....	5	1	4	1
31 and over.....	7	1	1	0

TABLE V

COMPARISON OF TOTALS OF PSYCHOLOGICAL CONTRIBUTIONS BY THE OLDER AND YOUNGER GROUPS OF PROFESSIONAL PSYCHOLOGISTS FOR THE DECADE, 1906-1915, INCLUSIVE

	Articles	Mono-graphs	Books	Discussions	General Reviews	Reports	Totals
Older.....	369	19	50	55	109	18	620
Younger.....	123	26	5	11	52	14	231

group consisted exclusively of the class of general reviews and reports. The accompanying tables show the distribution of the men in accordance with their scientific-literary productivity. In Table IV. there are shown the numbers of individuals in each group in relation to the total number of publications and in relation to the publications of articles and monographs. In Table V. there are shown the different

kinds of publications (articles, monographs, books, etc.) according to the groups. The average total number of contributions for the decade by the older men is 14.8, for the younger men it is 5.5; the average of articles and monographs by the older men is 9.2, and by the younger men only 3.5. These figures may be somewhat misleading if taken as they stand, on account of the difference in the total number of years that might be expected for scientific publication. The total years for the older group has already been said to be 420 (42 individuals for 10 years), and 214 for the younger group. When the comparison is made of total publications and of original (monograph and article) publications of the older group and of the younger group in relation to the expected number of years it is also found that the older group outranks the younger. Thus the individual yearly average for total contributions for the older group is 1.5, and only 1.1 for the younger group; and the individual yearly averages for articles and monographs are respectively .92 and .69 for the older and the younger men.

It is interesting to speculate on the reasons for these differences. Doubtless in most institutions the younger men are employed a greater part of the time in preparation of materials for the laboratory work of students and in the grading of themes, etc. In the smaller and less well endowed institutions there is less aid for the prosecution of investigations, and if aid can be obtained it takes an exorbitant amount of time to get the administrative machinery in running order. At the same time the younger group has to take considerable time in the preparation of material for their courses of instruction, and they are more frequently called upon to act as subjects or assistants for other research workers. On the whole the older group has the advantage of long established policies, of equipment, and of professional and mechanical assistance. At the same time the labor of teaching is correspondingly less on account of the previous experiences. Perhaps if we should compare the work of the older group, or of as many of them as held positions in the decade of 1891 to 1900, with that of the present younger group we should not find as great differences as now exist.

On account of the differences in time opportunity it is to be expected that the younger group would publish less in total and that the individual total would be less than many of those of the older group. Thus we find that nearly one half (19) of the older group reached or exceeded the average of 1.5 publications per year, and that only one third (12) of the younger group equalled or exceeded the yearly average for that group (.5 publications per year). Table IV. gives the results of the groupings. This shows that more than one half of the older men averaged one publication per year, seven having more than three per year. The figures for the younger group must be read in the light of the total yearly expectation (214 instead of 420). Each individual should be considered in relation to the total of his expected years of publication. Thus the six individuals of the younger group who exceeded ten publications had a total publication expectation of 44 years. The total of publications was 124, which gives a yearly average less than 3.

The data with regard to the character of the publications of the two groups are given in Table V. The difference in the number of books has already been mentioned. Monographs are apparently the prerogative of the younger man, the newly created doctor, for he has in proportion to the expected years two and one half times as many as his older colleague. The older men publish 33 per cent. more articles, as has been mentioned, they take part in more controversies as judged by the number of discussions, and they contribute an equal share of the general reviews. With regard to the last the remark may be necessary that the general review is most frequently due to 'request' and not infrequently a request to the elder is declined in favor of a younger colleague.

Since the different kinds of contributions are so varied no direct comparison may be made of individuals except in terms such as have already been used (total number of contributions, number of monographs and articles, and the relation of these to the expected years of publication). An indirect comparison may, however, be made if we assign to the different classes of publications an arbitrary numerical value. This

must be very arbitrary on account of the impossibility of making good comparisons of values, as has already been explained. It is also to be kept in mind that no arbitrary value for a class can be defended in particular cases, for if we consider two articles we may immediately note that one deals with an investigation in which some new methods have been used and the analysis of factors appears to be well wrought out, and we may also find that the second consists of a confirmation of previous work by the use of the same methods which had previously been used. Even in two articles which contain new facts or demonstrate new methods we may find similarities and divergencies of completeness or of apparent originality. It favors the majority of low grade (if we may use such a term) publications if we assign the same arbitrary value to all of one class, and this I have done. The values which I have selected for the different classes of publications are as follows: Reports of Meetings, 1; General Reviews, 2; Discussions, 3; Books, 6; Articles, 6; Monographs, 9. No justification of these arbitrary values will be attempted, but the following were in mind when the values were assigned. A discussion is often of no observable value in adding to our knowledge, and scientifically is worse than useless when it takes on the character of a personal attack. On the other hand, it may tend to clear up doubtful points, bring up new ways of viewing a situation, and at the same time by pointing out gaps in our knowledge indicate lines of investigation. In so far as a discussion does any of the latter things it appeared that it has a real value beyond that of a report of a meeting, and since a discussion also tends at times to inter in a suitable manner some supposed facts which very generally, but erroneously, have been accepted it was thought worthy of a greater value than that of a general review. It is assumed that all of our psychological discussions are of the good character mentioned. Differences exist in general reviews. Some are summaries of a few contributions of others. Some give a fairly complete account of current work with an evaluation of the material and thus help others who are not specializing in the subject to obtain a better view than would be ob-

tained by looking over the mass of details which the original sources contain. Some of the general reviews which we are considering here may be worthy of a higher value than some of the discussions, but many might bear a reduction of the general value figure. Here again it became necessary to decide for the majority rather than for the few. Much the same may be said with regard to books. Although the writer does not pretend to have the specialist's critical ability in every branch of psychology he is satisfied that many books published during the period are nothing more than general reviews, and at times poor ones. Some of the books have brought out new facts and explanations, they have added considerably to our psychological advance. But because of their general character it is thought that a value double that of a discussion and triple that of a general review would be an ample average value. The original, or research article (whether experimental or otherwise) was assigned a value equal to that of a book, and the monograph (but only on account of its length and supposed completeness) was assigned a value fifty per cent. higher. The remark previously made regarding monographs, that some monographs would be articles in other publication series, is a point against such a valuation, and the valuation is not insisted upon. The increase in value is on the side of the younger men, who most need the extra count.

Having selected the arbitrary values which have been mentioned it becomes possible to make comparisons of the output of different individuals without making special reference of an identifying character. At the same time it becomes possible to make comparisons of the groups since the heterogeneity of the different kinds of publications has been translated into a homogeneity.

The calculation of the individual values for the ten-year period shows that the range is from zero to 244. This means that some have contributed nothing and that others range from the zero point up to a valuation of 24.4 points per year. It is necessary to translate all the total valuations of the younger group into 'expected' values, or average yearly

values in accordance with the number of expected years of publication. When this is done for all individuals we find that there is a general average of 6.7 points per year for the group as a whole, and a median of 4.2. When the five individuals who have not contributed even as much as a report of a meeting during the decade are omitted the average is 7.2 and the median is 4.5. The distribution of the 84 individuals in respect to average yearly values of publications is given in Table VI. Eighteen of the older group and twenty-five of the younger group are below the median of all values; 22 of the older and 30 of the younger groups are below the average of the total. Arranging all in sequence of average yearly values and dividing into four equal parts, each containing 21 men, we find the following distribution of the older and younger respectively in the groups from lowest to highest: older, 10, 7, 11, 14; younger, 11, 14, 10, 7.

TABLE VI

GROUPING OF PROFESSIONAL PSYCHOLOGISTS ACCORDING TO AVERAGE YEARLY "VALUES" OF CONTRIBUTIONS FOR THE DECADE, 1906-1915, INCLUSIVE

Values	1.0 and Under	1.1- 2.0	2.1- 3.0	3.1- 4.0	4.1- 5.0	5.1- 6.0	6.1- 7.0	7.1- 8.0	8.1- 9.0	9.1- 10.0	10.1- 15.0	15.1- 25.0
Number of men.....	9	14	9	9	9	2	0	5	5	4	9	9

The older group on account of time, material equipment, academic relations, and other conditions has advantages which make it of special interest. All of the individuals had attained their higher degrees previous to 1906, about three quarters are heads of departments, and about the same number are connected with well-equipped and long-established laboratories. This group furnished four individuals who did not make a published contribution of any kind to psychological advancement in the decade. Six of the group contributed one original article or monograph during the ten-year period; two contributed two original contributions; two contributed three; and three contributed four. We have in this group, therefore, forty per cent. who have not averaged an original contribution once in two years. Some of these seventeen

individuals did contribute in other directions besides monographs and articles, for they published 5 books, 33 general reviews, 2 discussions, and wrote one report of a meeting. Besides the four who did not make any kind of a contribution there were four additional who made no contribution beyond the original articles and monographs published. On the whole the younger group, while not as productive as the older, show better results with respect to the publication of individuals. Only one (duration three years) has not published, as is mentioned above. Ten others have not published as frequently as once in three years; there is a total of sixteen who have not published as frequently as once in two years.

Since the older group had the opportunity to publish for ten years we need not deal with averages entirely, but may consider totals as well, on account of the homogeneity of the series. It is of interest to know that seven of the group (17 per cent.) contributed a total of 159 articles and monographs (41 per cent.); the highest half of the group (21) contributed eighty-seven per cent. of all the articles and monographs of the group (337 articles and monographs). This leaves for fifty per cent. of the older men only thirteen per cent. of the articles and monographs published by the group.

The majority of older men who have contributed little in the way of articles and monographs, and also to the total, have held their present positions for many years, and have apparently 'grown up' in their present locations, they are located in some of our better endowed institutions, and in those with good laboratory facilities, they have colleagues teaching in the same lines, and they occupy what may be properly called positions of prominence in their respective institutions. They have not the apparent disadvantages of isolation, or of having to carry the burden of the psychological world upon their shoulders since there are colleagues to help in teaching and perhaps in research. But these are some of the men who are representing psychology as a science in their respective university niches. Those of the younger group who are least productive, and have given little evidence

of interest in psychological advance by publication, are mostly located in the smaller institutions, where there are no colleagues of sufficient training or productiveness to be elected members of the American Psychological Association. There are in the younger group exceptions to this, several notable cases being evident when the list is inspected. Without going into the figures for total or original publications, since the number of men at the different institutions is small, it may be stated that those younger men who have the opportunity to remain at a long-established department have done better than those in the more recently created departments. But this does not hold for particular cases, since there are surprising exceptions of individuals with apparently all the advantages which can be obtained in the better endowed institutions doing little or nothing which is prepared for the edification of their scientific colleagues.

It should not be assumed, and it is here stated to the contrary in order that there may be no misunderstanding, that these men are doing nothing for psychological advance. Some may have editorial duties, some may conceal themselves in the work of their students, and some (like Herbert Spencer) may be reserving their energies for some *magna opera* which will be given to the world in due time. It seems unlikely, however, that as many as 40 per cent. of the older group are engaged in the accumulation of material for the development of a cosmology, or of a system of psychology, or of an exhaustive history of the science, or of other large projects which should not be laid aside in favor of the minor contributions such as articles and monographs. It is apparent that a few of those who hold chairs of psychology are contenting themselves with teaching and the carrying out of the social obligations which fall to the lot of every scientific man, who must meet his colleagues and take part in the life of the university with which he is connected. Whether or not there are more psychologists who are doing these things than scientific men in other lines can not now be determined. And, the other view may be expressed that those who are contributing much do so without proper scientific care and because of reportorial

tendencies. The character of the work of many of our most productive men shows that they have not done their work at the expense of care. But, the writer feels that some of the so-called 'professional' psychologists should be classed with dilettantes; they are not scientific professionals in the sense that they are forging ahead and that they are succeeding because of their efforts in scientific work.

Much has been written recently about university positions and university control; the professor always being the oppressed and the university as represented by the president being the oppressor. I have a feeling that part of the dissatisfaction may be due to the 'great promise' for which candidates have been recommended never showing up in practice. A president of one of our leading institutions has been criticized for saying that every man on the faculty may be expected to publish at least one article every two years. It may be that he had had experience with those of 'promise' and not of performance. Much has also been written about academic tenure, as if that was a sacred right (or rite), but the critic might well imagine a better state of affairs to follow in some of our universities if there was a power of recall for those members of the faculty who do not measure up to the expected or to the average amount of performance. If the present methods of filling positions, from the grade of professor down to that of instructor, be continued we shall always have some of little or no accomplishment (the dilettantes) filling important chairs, especially if there be the added conditions that promotions be made as vacancies occur. It is the writer's belief that much of the inconsistencies would be eliminated if every vacancy were advertised as open to application, stating that applicants were expected to send in the accounts of their academic careers, copies of publications, etc., and that these would be graded by a non-interested committee of specialists (advisory board) who would report to the faculty or to trustees the results of their findings. We should probably escape the absurdity of having in one year two young men recommended from one university as 'geniuses of the first water.' This has happened, and the writer is not certain which is to be the more pitied, the university which permitted its 'geniuses' to go to other institutions, or the universities which would accept men who were recommended as such.

Another matter may be worth considering briefly. This is the relation of productivity to the institutions from which the higher degrees were received. In pointing to psychological advances in institutions, we have hitherto been content to mention the number of doctorates which have been granted. But it is obvious that numbers count for very little in progress, unless one is going to play a mass game or overrun a weak nation. What should be considered is the question: What have the doctors done after leaving an institution? And we may also ask: Has the training which is supposed to fit the man for research been effective in stimulating him to efforts in that direction? Part of these ques-

tions may be answered by considering the performance of those granted higher degrees by different institutions. Of the 84 men on the present list 17 were scattering with respect to institutions, but the remainder were distributed over seven institutions. Only one institution is mentioned by name (Leipzig), the other individual institutions (American) are represented by letters. The 17 scattering cases are grouped together as 'other foreign' and 'other American.' Table VII.

TABLE VII

COMPARISON OF PUBLICATIONS OF ALL KINDS AND OF ARTICLES AND MONOGRAPHS, BY GROUPS OF PROFESSIONAL PSYCHOLOGISTS, ARRANGED ACCORDING TO INSTITUTIONS CONFERRING DOCTORATES. (TWO INDIVIDUALS WHO HAVE NOT RECEIVED THE DOCTORATE ARE INCLUDED UNDER THE INSTITUTIONS WHICH CONFERRED THEIR HIGHER DEGREES)

Institutions	Leipzig	A	B	C	D	E	F	Other Foreign	Other American
Numbers of men.....	8	11	7	15	11	8	7	6	11
Total expected years.....	78	79	54	132	74	58	42	57	60
All publications:									
Total credits.....	859	674	421	884	381	226	103	422	269
Credits ÷ years.....	11.0	8.8	7.8	6.7	5.1	3.9	2.5	7.4	4.5
Range of average yearly credits of individuals	3.6-18.6	1.5-19.3	1.1-23.0	0.0-24.4	1.4-14.0	0.6-11.3	0.0-7.5	0.6-9.4	0.0-10.2
Articles and monographs:									
Credits.....	603	510	360	708	312	198	96	348	222
Credits ÷ years.....	7.7	6.5	6.7	5.4	4.2	3.4	2.3	6.1	3.7

gives the numbers of men from different institutions, the total years under consideration (the total 'expected' years of all in the special group), the total credits, the relation of credits to the total expected years of publication, and the minimum and maximum average yearly credits by the individuals in the groups.

Probably the total expected years, rather than number of individuals, is a better means of comparison with the totals of publications, and the relation of these two are shown in the fifth line. Here it will be observed that the 8 men from Leipzig far surpass the groups from the other universities. They have the highest minimum, showing that each is publishing fairly regularly, and although they are surpassed in maxima by three other institutions this is largely due to a few very

productive men. The men from Leipzig have mostly been of the older group, as indicated by the average of expected years (9.8), but the average is not much greater than that (9.5 years) for the group from Other Foreign Institutions. Leipzig also closely approaches the total of *C*, although the number of men is only slightly over half, and the total number of expected years is about 60 per cent. of this American university. The order of institutions in total credits divided by expected years is as follows: Leipzig, *A*, *B*, Other Foreign, *C*, *D*, Other American, *E*, and *F*. When now we compare the performance of the doctors from the different institutions in relation to publication of articles and monographs we find the results shown in the last two lines of Table VII. Here again Leipzig shows a great superiority. The order of institutions in credits divided by years has not materially changed, there being a reversal of the order for *B* and *A*. The remainder of the table speaks for itself.

One matter remains to be briefly considered. This is the relation of administrative work to the carrying on of scientific production. Our group contains five individuals who have given their occupation as partly that of dean or president. Two of these individuals notwithstanding their arduous administrative duties have managed to carry on investigations and to publish the results of them. At the same time they have both for total and for original publications managed to be in the more productive class. The other three probably have their administrative duties as reasons for their relative non-performance. In the group there are also eleven who have greater or less editorial duties in connection with the publication of periodicals. Of this group two have been below the average in performance. Both of these extra-scientific duties (administration and editing) have not interfered with the production of an average amount of scientific articles by two thirds of the men thus engaged, and it may be that these added functions have been beneficial rather than the reverse. In the estimation of productivity of individuals editorial functions have been omitted and had these been added to the totals in some numerical way it is quite likely

that more of the group of editors would have approached the top. As the arrangement now stands, counting only articles, books, reviews, etc., we find that two thirds are in the higher half of the distribution, and of these most are in the higher quarter.

It is pertinent to remark that psychology appears to be getting from those whose chief interests are not in its development (from the non-professional psychologists, in other words) as much as, if not more than, from many of its own men.¹ From some of its own psychology is receiving much less than should be expected, and there is, perhaps, some reason for the assertion that "were it not for an academic title it would be difficult to discover the reason why certain individuals are called psychologists." In conclusion the attention of the reader is called to the consideration of the wisdom of the action of certain scientific societies which require that a member shall retain membership in them only as long as he continues to show an active interest in the advancement of his science by publication, provided continued ill-health or other disabling conditions (old age and the like) do not prevent.²

¹ I expect to deal with the psychological contributions of these non-professional members of the Association in another article.

² A constitutional amendment of this character was recommended by its council to the American Psychological Association at one of its meetings, and at the subsequent meeting the council reversed its recommendation (see the Proceedings of the Association for the years 1906 and 1907).

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